

Claims

1. (Currently amended) A method for ~~designing~~ forming a tire tread having a tire noise pitch sequence for a pneumatic tire; the method comprising the steps of:

selecting at least a first, a second, and a third modulation order;

non-randomly selecting the amplitude for each of the selected modulation orders; the amplitudes of the first modulation and second modulation orders being selected to be smaller than or equal to the amplitude of the third modulation order;

non-randomly selecting the phase for each of the selected modulation orders;

creating a function for each modulation order that includes the defined amplitude and phase of the modulation order;

summing the created functions for each modulation order to define a summation of the functions;

defining a tire noise pitch sequence from the summation of the functions;
and

arranging tread lugs on a tire tread of a pneumatic tire to match the tire noise pitch sequence.

2. (Original) The method of claim 1, wherein the step of defining the tire noise pitch sequence includes the step of calculating a determined number of pitch sizes from the summation of the functions.

3. (Original) The method of claim 2, wherein the step of calculating the determined number of pitch sizes from the summation of the functions includes the step of using the accumulation of the deviation of the arc length from the arc length of the mean pitch size.

4. (Original) The method of claim 3, further comprising the step of interpolating a curve defined by the accumulation of the deviation of the arc length from the arc length of the mean pitch size.

5. (Previously presented) The method of claim 4, further comprising the steps of:

selecting a total number of pitches, a number of different pitch sizes, and pitch ratios; and

fitting the determined number of pitch sizes to the selected number of pitch sizes.

6. (Previously presented) The method of claim 2, further comprising the steps of:

selecting a total number of pitches, a number of different pitch sizes, and pitch ratios; and

fitting the determined number of pitch sizes to the selected number of pitch sizes.

7. (Original) The method of claim 6, further comprising the step of setting the selected number of pitch sizes to a number between 3 and 7.
8. (Original) The method of claim 6, wherein the step of fitting the determined number of pitch sizes to the selected number of pitch sizes includes the step of identifying the range of determined number of pitch sizes and evenly dividing the identified range by the selected number of pitch sizes.
9. (Original) The method of claim 6, further comprising the steps of selecting the number of different pitch sizes to be 5 and selecting the pitch ratios to be 1.00, 1.10, 1.25, 1.40, and 1.50.
10. (Original) The method of claim 6, further comprising the steps of selecting the number of different pitch sizes to be 3 and selecting the pitch ratios to be 1.00, 1.25, and 1.50.
11. (Previously presented) The method of claim 1, wherein the step of selecting at least a first, a second, and a third modulation order includes the step of selecting between 3 and 7 modulation orders.
12. (Previously presented) The method of claim 11, wherein the step of selecting the amplitude for each of the selected modulation orders includes the

step of defining the amplitudes of the first and second modulation orders to be smaller than the amplitudes of the remaining selected modulation orders.

13. (Previously presented) The method of claim 12, wherein the step of selecting the amplitude for each of the selected modulation orders includes the step of defining the amplitudes of the first and second modulation orders to be zero.

14. (Previously presented) The method of claim 12, wherein the step of selecting the amplitude for each of the selected modulation orders includes the step of varying the amplitudes for the selected modulation orders.

15 - 20. (Canceled)

21. (Currently amended) A method for ~~designing~~ forming a tire tread having a tire noise pitch sequence for a pneumatic tire; the method comprising the steps of:

- selecting three, four, five, six, or seven modulation orders;
- defining an amplitude for each of the selected modulation orders;
- defining a phase for each selected modulation order;
- creating a function for each modulation order that includes the defined amplitude and phase of the modulation order;

summing the created functions for each modulation order to create a wave Y having a curve;

defining a lug stiffness variation curve (D_i) to be the accumulation of the deviation of the arc length from the arc length of the mean pitch size;

setting the lug stiffness variation curve equal to the curve of the Y wave to define an equation;

solving the equation to obtain a unique set of pitch sizes;

using the unique set of pitch sizes to define a tire noise pitch sequence and

arranging tread lugs on a tire tread of a pneumatic tire to match the tire noise pitch sequence.

22. (Previously presented) The method of claim 21, further comprising the steps of selecting a total number of pitches, five different pitch sizes, and pitch ratios of 1.00, 1.10, 1.25, 1.40, and 1.50; and fitting the unique set of pitch sizes to the selected five pitch sizes.

23-24. (Canceled)

25. (Previously presented) The method of claim 21, further comprising the steps of selecting a total number of pitches, three different pitch sizes, and pitch ratios of 1.00, 1.25, and 1.50; and fitting the unique set of pitch sizes to the selected three pitch sizes.

26. (Previously presented) The method of claim 21, further comprising the step of defining the amplitudes of the first and second modulation orders to be smaller than the amplitudes of the remaining selected modulation orders.

27. (Previously presented) The method of claim 26, further comprising the step of defining the amplitudes of the first and second modulation orders to be zero.

28. (Previously presented) The method of claim 26, further comprising the step of varying the amplitudes for the selected modulation orders.